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HENSLEY KIM & EDGINGTON, LLC
1660 LINCOLN STREET, SUITE 3050
DENVER, CO 80264

EXAMINER	
TUCKER, WESLEY J	

ART UNIT	PAPER NUMBER
2623	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/900,479	TRIFONOV ET AL.	
	Examiner	Art Unit	
	Wes Tucker	2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 April 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-46* is/are pending in the application.

4a) Of the above claim(s) *1,3,5,7,18,23,26 and 28-30* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2,4,6,8-17,19-22,24,25,27,31-37,39-42 and 44-46* is/are rejected.

7)☒ Claim(s) *38 and 43* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 October 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's response to the last Office Action, filed June 8th, 2004 has been entered and made of record.

2. Applicant has canceled claims 1, 3, 5, 7, 18, 23, 26, 28, 29 and 30. Applicant has amended claims 2, 4, 13, 14, 16, 17 and 31. Applicant has added new claims 32-44.

3. Applicant's arguments have been fully considered but are not completely persuasive for at least the following reasons:

4. With regard to the 102 rejection in view of Fiete of Claim 31, applicant argues that the inherency of a using "a specified range of sharpness" to detect line defects is not supported. Examiner submits that sharpness is simply and broadly read as the contrast of a digital image which is by definition the difference between pixel values within the image, therefore in order to make a detection or identification of a line or noise or any value difference in a digital image there must be a specified range of sharpness which would equivalently be a threshold of the difference in the values of adjacent pixels used in order to make a determination. Therefore a specified range of sharpness would inherently be used when detecting the difference between pixel values. The 102 rejection of claim 31 is accordingly maintained.

5. With regard to the 103 official notice rejection of claim 34 which contains the same subject matter of the above mentioned Claim 31, Applicant argues that official

notice is improperly taken as the "principal point of rejection." Examiner submits that the principal point of rejection is the same as used in regard to claim 31 and that the use of a computer with software is secondary to the rejection because it is so exceedingly well-known in the art to perform image processing using a computer program product. Indeed Examiner submits that it is inherent that Fiete use a computer with software to perform the operation as shown by the program code (software) in columns 9 and 10 and further that a computer using software is inherent in performing any operation on a digital image. For the sake of argument the official notice has been withdrawn and claims 31 and 34 are now rejected under 35 USC 102(b).

6. With regard to the 103 rejections of claims 2, 4, 6, 8-17, 19-22, 25,27, 32, 33, 35-37, 39-42 Applicant argues that there is insufficient motivation to combine the inventions of Fiete and Trifonov because the methods of detecting streaks or line defects use different techniques. However Examiner submits that Fiete is relied upon only to show the removal of line defects once they are detected. The removal of line defects is well known in the art and it would have been obvious to use any number of methods to remove such defects once they are determined by the local radial angular transform disclosed by Trifinov. The 103 rejections are therefore maintained in view of the combination of the references to Fiete and Trifinov.

Objection to the Amendment

8. The amendment filed April 5th, 2004 is objected to under 35 U.S.C. 132 (a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows:

The amendments to the specification which change the various equations/mathematical relations at the following locations (it is noted that Applicants, in their amendment, have incorrectly presented the text of the original specification being replaced):

a) page 8, line 6 (changes "1/6" to "1/√6");

b) page 8, line 12 (changes "0.5/6" to "0.5√6" and "0.5/2" to "0.5/√2");

c) page 8, line 17 (changes "0.5/6" to "0.5√6");

d) page 8, line 18 (changes "0.5/2" to "0.5/√2");

Applicant is required to cancel the new matter in the reply to this Office Action. With the current amendment as evidence, attempts to change the equations/mathematical relations in the specification back to their original form could raise issues of non-enablement under 35 U.S.C. 112 first paragraph, as well as non-operability under 35 U.S.C. 101.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 31 and 34 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,881,182 to Fiete.

With regard to claim 31, Fiete discloses a method for removing line defects from a still image by providing image data in digital form (column 2, lines 48-50), detecting line defects in the image of a specified range of sharpness without manually designating the spatial location of the line defects (column 2, lines 48-50), and adjusting the image data to correct the detected line (column 2, 58-60). Sharpness is simply and broadly read as the contrast of a digital image which is by definition the difference between pixel values within the image, therefore in order to make a detection or identification of a line or noise or any value difference in a digital image there must be a specified range of sharpness which would equivalently be a threshold of the difference in the values of adjacent pixels used in order to make a determination. Therefore a specified range of sharpness would inherently be used when detecting the difference between pixel values.

With regard to claim 34, the discussion of claim 31 applies. Fiete also discloses a computer program product by disclosing computer program code (columns 9 and 10). It is inherent that Fiete use a computer with software to perform the operation as shown by the program code.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2, 4, 6, 8-17, 19-22, 25, 27 32, 33, 35-37, 39-42 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of U.S. Patent 5,881,182 to Fiete et al. and prior art document entitled "Local Radial-Angular Transformation of Images" by M.I. Trifonov and P.A. Medinnikov hereinafter referred to as Trifonov.

With regard to claim 2, Fiete discloses a method for removing line-like defects from an image by providing image data in digital form, analyzing segments of the image data as groups of pixels (column 2, lines 48-50), detecting line defects in the image and adjusting the image data to correct the detected line defects (column 2, lines 48-50). Fiete does not disclose detecting line defects by application of a local radial angular transform. Trifonov discloses a local radial angular transform used to determine luminance differentials in the local vicinity of image points and the local properties of the shape of boundaries (p. 238, last 5 paragraphs). The shape of boundaries and luminance differentials are interpreted as line determination or line-like defect

determination. Trifonov teaches that the local radial transform enables the advantage of flexibility in the description of images relative to its local variations (p. 238, last 4 paragraphs). Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to use the local radial angular transform as taught by Trifonov to describe the boundary shapes or lines with flexibility in order to remove the line defects in the invention of Fiete.

With regard to claim 4, Fiete discloses the method in which the line detector detects a line according to at least one characteristic from the group comprising line lightness higher than the surroundings, line lightness lower than the surroundings, line contrast with respect to surroundings (column 3, lines 54-63), and line orientation with respect to the image borders (column 5, lines 47-50). Line lightness, darkness, or contrast is interpreted as the illumination radiance function and the line orientation is interpreted as the slope determination.

With regard to claim 6, Fiete discloses the method wherein the image is a color image (column 3, lines 45-50). Fiete discloses using the method on photographic or film images both known to be in color.

With regard to claim 8, Fiete discloses the method wherein the image data is provided in a color space format that includes a brightness value (column 3, lines 53-

63). Here the illumination function is considered to be a brightness value in the color space format.

With regard to claim 9, Trifonov discloses wherein a geometric pattern of groups of pixels is selected and used to detect line-like structures in image data (p. 238, last 5 paragraphs and figures on p. 236). The shape of boundaries and luminance differentials are interpreted as line determination or line-like structure detection.

With regard to claim 10, Trifonov discloses a geometric pattern of hexons (p.236).

With regard to claim 11, Trifonov discloses the method wherein a geometric pattern of groups of pixels is selected and used to detect line-like structures in image data (p. 238, last 5 paragraphs and figures on p. 236). The shape of boundaries and luminance differentials are interpreted as line determination or line-like structure detection.

With regard to claim 12, Trifonov discloses a geometric pattern of hexons (p.236).

With regard to claim 13, Trifonov discloses the method wherein the hexons are laid over the image (p.236).

With regard to claim 14, Trifonov discloses wherein a modulus of the transformation coefficient, c3, is used to indicate the presence of a line-like feature in the image under the hexon over the image (p. 236). Here the coefficients serve to describe the image content or the local properties of boundaries or lines in the image (p.238, last 4 paragraphs).

With regard to claim 15, Trifonov discloses the method wherein brightness differences within the groups of pixels are used to identify line-like features (p.237, paragraphs at the bottom of the page). Trifonov discloses the use of luminance or brightness values.

With regard to claim 16, Fiete and Trifonov disclose the method of claim 2, but do not disclose wherein an operator of the method selects the type of line defect to be corrected by selecting from among the group consisting of a) light line defects, b) dark line defects, and c) both light line defects and dark line defects. The streaks in the method of Fiete are determined by pixel contrast or difference with the surrounding pixels (column 2, lines 30-60), as the boundaries are determined using the luminance values in Trifonov (p.237, last paragraphs). It would have been obvious to one of ordinary skill in the art at the time of invention to set the difference thresholds according to the lightness or darkness of the streak pixels in order to remove either a dark or light streak.

With regard to claim 17, Fiete discloses a method of correcting line-like defects in a single still image without requiring the defects to be manually delineated, the method comprising providing image data in digital form, analyzing segments of the image data as groups of pixels (column 2, lines 48-50), automatically detecting line defects in the image, and adjusting the image data to correct the detected line defects (column 2, lines 48-50). Fiete does not disclose detecting line defects by application of a local radial angular transform. Trifonov discloses a local radial angular transform used to determine luminance differentials in the local vicinity of image points and the local properties of the shape of boundaries (p. 238, last 5 paragraphs). The shape of boundaries and luminance differentials are interpreted as line determination or line-like defect determination. Trifonov teaches that the local radial transform enables the advantage of flexibility in the description of images relative to its local variations (p. 238, last 4 paragraphs). Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to use the local radial angular transform as taught by Trifonov to describe the boundary shapes or lines with flexibility in order to remove the line defects in the invention of Fiete.

With regard to claim 19, Fiete discloses the method of claim 17 wherein automatically detecting defects in the image is determined by a program which analyzes for line-like patterns and their relative darkness or lightness with respect to surrounding

pixels or surrounding pixel groups (column 3, lines 54-63). Line lightness, darkness, or contrast is interpreted as the illumination radiance function.

With regard to claim 20, Fiete discloses the method of claim 17 wherein automatically detecting defects in the image is determined by a program, which analyzes for line-like patterns and their contrast with respect to the surroundings (column 3, lines 54-63). Line lightness, darkness, or contrast is interpreted as the illumination radiance function.

With regard to claim 21, Fiete discloses the method wherein limits of detection are imposed (column 2, lines 47-56). Fiete discloses that distinctions are made between normal pixel differences and pixel differences caused by streaking or linear defects. Fiete does not discloses allowing an operator to adjust the two contrast limits L1, and L2 to restrict what regions of the image are to be selected as a defect area. However thresholds for determining what is a statistical outlier (column 2, lines 53-56) are well known in the art. Examiner takes official notice. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to allow an operator to set the limits in order to define what would be classified as a streak or line.

With regard to claim 22, Fiete discloses a statistical outlier analysis (column 2, lines 53-56) wherein pixel are determined to be unrelated to streaking due limits. It

would have been obvious to one of ordinary skill in the art to use limits to determine what is and what is not a defect.

With regard to claim 25, Fiete discloses a threshold value to determine limits on detected line defects (column 2, lines 53-56). Fiete discloses a statistical outlier analysis wherein pixels are determined to be unrelated to streaking due to some kind of limits or thresholds. It would have been obvious to one of ordinary skill in the art to use limits to determine what is and what is not a defect. Trifonov discloses the determination of data with a local radial angular transform (p. 238 first paragraph) to determine boundary or line information. Therefore although Trifonov does not disclose using thresholds to determine limits, it would be obvious to one of ordinary skill in the art to impose limits or thresholds as taught by Fiete in order to determine the amount of line detection to be performed.

With regard to claim 27, Fiete discloses a computer containing software and hardware that enables execution of the process of claim 2 (column 2, lines 30-35). It is understood that a computer containing hardware and software are necessary to perform operations on digital images.

With regard to claim 32, the discussion of claim 2 applies. Fiete and Trifonov disclose the method of claim 2, but do not explicitly disclose the use of a computer program product. However Examiner takes Official Notice that it is well known to

implement image processing methods using hardware and software. Given the flexibility of computers and software offer, and their widespread use in the art, it would have been obvious to one of ordinary skill in the art to utilize a computer having software to enable execution of the processes discloses by Fiete and Trifonov.

With regard to claim 33, the discussion of claim 17 applies. Fiete and Trifonov disclose the method of claim 17, but do not explicitly disclose the use of a computer program product. However Examiner takes Official Notice that it is well known to implement image processing methods using hardware and software. Given the flexibility of computers and software offer, and their widespread use in the art, it would have been obvious to one of ordinary skill in the art to utilize a computer having software to enable execution of the processes discloses by Fiete and Trifonov.

With regard to claim 35, Fiete discloses a method of removing a defect from a digital image (column 2, lines 33-42).

Fiete further discloses defining a geometric pattern of pixel groups in the digital image (column 2, lines 48-50). Here any group of pixels is considered to be a geometric pattern of pixels.

Fiete also discloses adjusting digital image data of the defect to remove the defect from the digital image.

Fiete does not disclose determining a brightness vector representing mean brightness associated with each of the pixel groups; determining local radial angular

transform coefficients based on the brightness vector; or identifying a presence of a defect within the geometric pattern based on at least one of the local radial angular transform coefficients.

Trifonov discloses determining a brightness vector representing mean brightness associated with each of the pixel groups (p.235, first paragraph in first column). Trifonov discloses calculating mean image Luminance values.

Trifonov also discloses determining local radial angular transform coefficients based on the brightness vector (p.235, column 1, first paragraph).

Trifonov further discloses identifying a presence of a defect within the geometric pattern based on at least one of the local radial angular transform coefficients (p.238, last 5 paragraphs). Trifonov discloses a local radial angular transform used to determine luminance differentials in the local vicinity of image points and the local properties of the shape of boundaries (p. 238, last 5 paragraphs). The shape of boundaries and luminance differentials are interpreted as line determination or line-like defect determination. Trifonov teaches that the local radial transform enables the advantage of flexibility in the description of images relative to its local variations (p. 238, last 4 paragraphs). Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to use the local radial angular transform as taught by Trifonov to describe the boundary shapes or lines with flexibility in order to remove the line defects in the invention of Fiete.

With regard to claim 36, Trifonov discloses wherein the at least one of the local radial angular transform coefficients has a non-zero imaginary component and a non-zero real component (p.238, left column).

With regard to claim 37, Trifonov discloses determining an angle of the defect using imaginary and real components of the at least one of the local radial angular transforms (p.238, left column). Trifonov discloses using real and imaginary components in determining a matrix in which the defect would be found and the X and Y components in the matrix directly related to the real and imaginary components are used to determine slope or angle of the defect.

With regard to claim 39, Fiete discloses evaluating information by using a defined threshold to determine the defined type of defect (column 2, lines 53-56). Fiete discloses performing statistical outlier analysis to determine the defect, which must utilize thresholds. Trifonov discloses the local radial angular transform coefficients. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to use the thresholds of Fiete to determine the defects with the detection using local radial angular transforms as taught by Trifonov in order to determine the type and degree of defects to be corrected.

With regard to claim 40, the discussion of claim 35 applies. Fiete and Trifonov disclose the method of claim 35, but do not explicitly disclose the use of a computer

program product. However Examiner takes Official Notice that it is well known to implement image processing methods using hardware and software. Given the flexibility of computers and software offer, and their widespread use in the art, it would have been obvious to one of ordinary skill in the art to utilize a computer having software to enable execution of the processes discloses by Fiete and Trifonov.

With regard to claim 41, the discussion of claim 36 applies.

With regard to claim 42, the discussion of claim 37 applies.

With regard to claim 44, the discussion of claim 39 applies.

With regard to newly added claim 45, Fiete and Trifinov disclose the method of claim 2, and Trifinov further suggests wherein a value resulting from the application of a local radial angular transform distinguishes the line defect from other line-like features (p. 238, right column). Trifinov discloses estimating the magnitude of luminance differentials and further states that the coefficients given in table 1 are proportional to the luminance differential therefore making it possible to construct algorithms for describing real fragments of images by binary images. Trifinov further discloses that the radial angular transformation can also be used in the classification of luminance differentials by using the coefficients as a measure of magnitude. This reads on the

capability of distinguishing line defects from other line features because luminance differentials or line features are able to be classified according to magnitude.

With regard to claim 46, the discussion of claim 45 applies.

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of U.S. Patent 5,881,182 to Fiete et al. and prior art document entitled "Local Radial-Angular Transformation of Images" by M.I. Trifonov and P.A. Medinnikov hereinafter referred to as Trifonov et al. and The Sony Corporation publication: "Combining Frequency and Spatial Domain Information for Fast Interactive Image Noise Removal" by Anil N. Hirani and Takashi Totsuka hereinafter referred to as Hirani.

With regard to claim 24, Fiete and Trifonov disclose the method of claim 2, but do not disclose that the operator marks a selected area of the image on which to practice the method. Hirani discloses a method for removing streaking artifacts wherein a user selects sub-images or areas within an image on which to perform the correction (section 4.1, first 10 lines). It is well known in the art of image processing to perform image enhancing operations on selected areas of an image in order to enhance on certain parts of the image while keeping the rest of the image unchanged. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to have a user select the areas of an image to enhance so that only portions of the image would be changed.

Allowable Subject Matter

Claims 38 and 43 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wes Tucker whose telephone number is (571) 272-7427. The examiner can normally be reached on 9AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (571) 272-7414. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Wes Tucker

VIKKRAM BALI
PRIMARY EXAMINER

7-5-05